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User Manual

HS SAM Gen II

High Speed Stand Alone Module for ARINC 818

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1 Overview

1.1 Included with Your HS SAM Gen II

- Wall adapter: 100–250VAC @ 50–60Hz to 24VDC
- USB cable for direct connection from your computer (PC or laptop) to the HS SAM
- LC fiber-optic cable
- HS SAMView2 software installation on CD-ROM

1.2 Configurations

A SAM comes configured either for Fiber-to-DVI or for DVI-to-fiber:

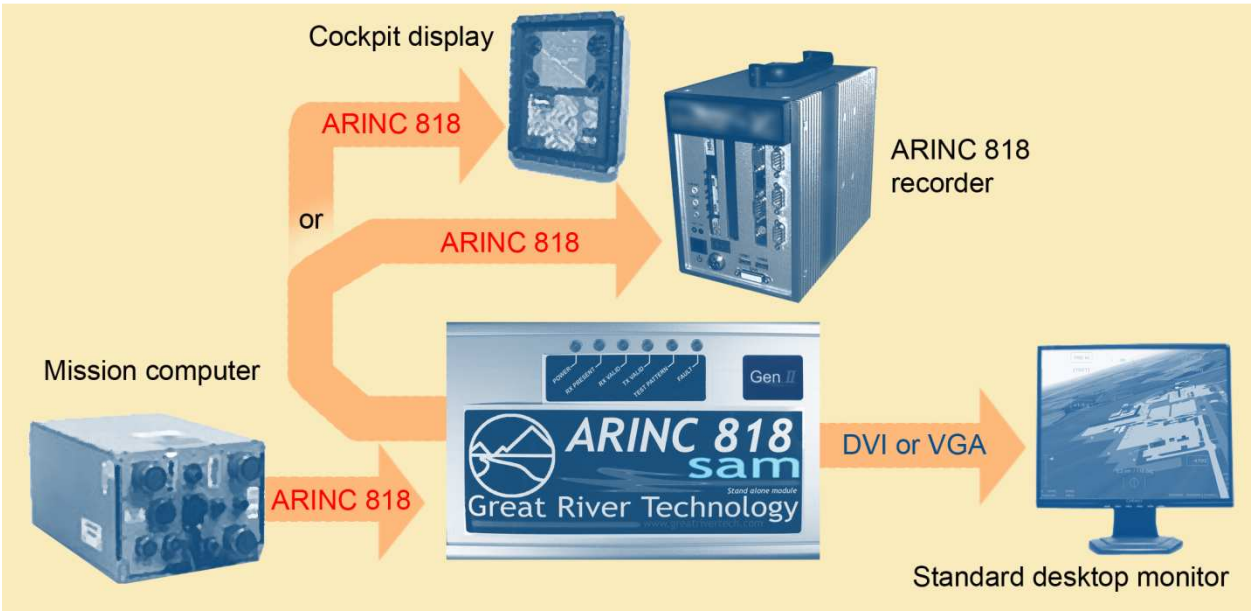

Figure 1.2a. Fiber-to-DVI (F2DVI).

Figure 1.2b. DVI-to-fiber (DVI2F).

1.3 HS SAMView2 software

The HS SAMView2 software offers a graphical user interface (GUI) to access the following features of the HS SAM Gen II:

- loading and retrieval of ARINC 818 images and data to and from the unit
- header management
- remote unit status monitoring

- video source manipulation (test pattern, DVI in, static image)
- multiple SAM control points

Figure 1.3. HS SAMView2 (main screen).

2 Using HS SAM in stand-alone operation

The HS SAM unit is completely operational without connecting to USB. That is, the DVI-to-fiber versions of the SAM will convert DVI to ARINC 818 video and will generate test patterns. Similarly, the Fiber-to-DVI versions of the SAM will convert ARINC 818 video to standard DVI video.

The USB connection, along with HS SAMView2 software will allow users to perform additional functions, such as:

- Loading and retrieving *.bmp images into the SAM
- Loading and retrieving Object 0 data into the unit
- Changing the default Object 0 frame values loaded from power up

The HS SAM can be

2.1 Rocker switch functions

The rocker switch (Fig. 2.1) has three positions:

- **Reset**—Resets internal electronics and returns all ARINC 818 outputs to idle
- **Run**—Accommodates normal operation

- **Test Pattern**—Transmits canned test-pattern video instead of source video to ARINC 818 or DVI output (only in units with test-pattern capability)

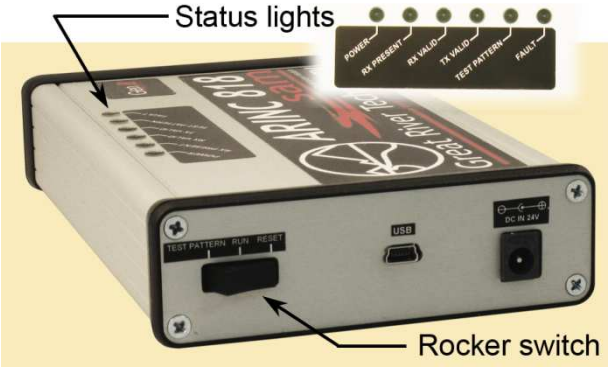

Figure 2.1. Settings and status.

2.2 Status LEDs

There are six LED status lights:

- **Power**—The unit is currently powered and ready.
- **RX Preset**—The unit has detected a DVI or ARINC 818 video output.
- **RX Valid**—The input video source is valid.
- **TX Valid**—The DVI or ARINC 818 output is enabled.
- **Test Pattern**—For units with test-pattern capability, test patterns are being transmitted on the ARINC 818 or DVI output.
- **Fault**—An input error has been detected.

3 Using HS SAM with HS SAMView2 Software

Once installed, the HS SAMView2 software can be run from the start menu as follows:

Figure 3. HS SAMView2 from start menu.

3.1 Connecting to the HS SAM via USB

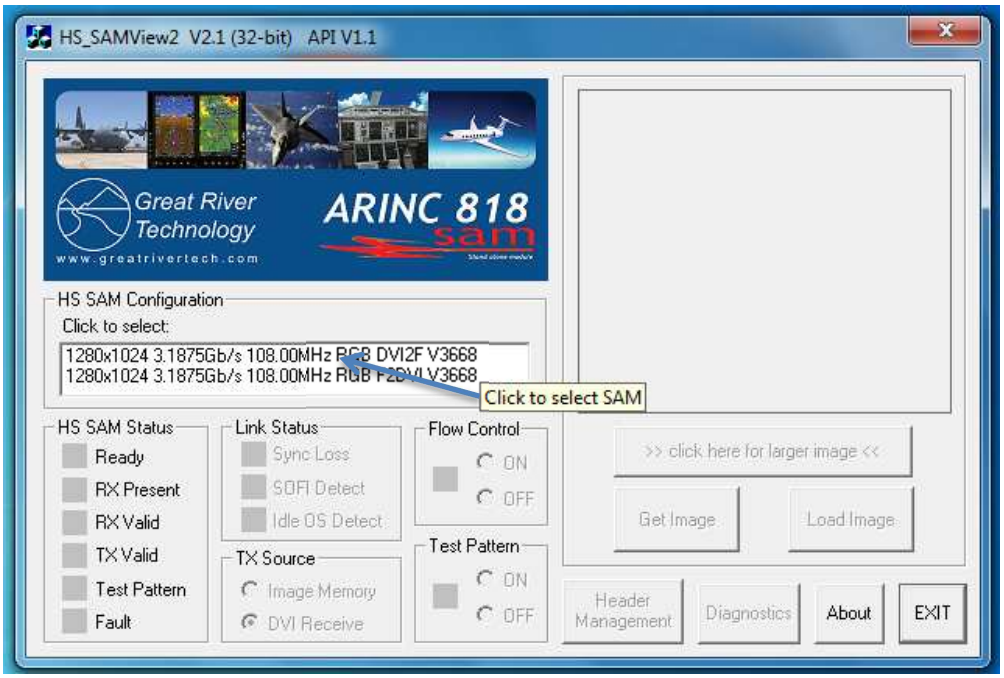

Figure 3.1. Selecting an HS SAM.

When the application launches, it will detect all HS SAM units that are connected by USB. These units will be displayed in the HS SAM configuration window in the order they were connected, newest at bottom, as shown above. Simply click on a unit in the list to connect to it by USB.

3.2 Status Indicators

Once connected, the HS SAMView2 Status LEDs will become active as shown below:

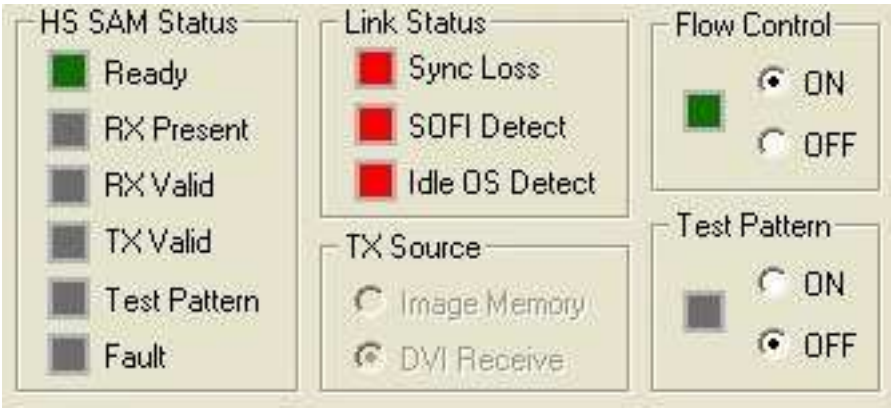

Figure 3.2. Status LEDs in SAMView2 (shown in a fiber receiver configuration).

There are six HS SAMView2 status lights:

- **Ready** —The USB connection has been made and is operational.

- **RX Preset** —The unit has detected a DVI or ARINC 818 video output.
- **RX Valid** —The input video source (either DVI or ARINC 818) is valid.
- **TX Valid** —The DVI or ARINC 818 output is valid.
- **Test Pattern** — For units with test-pattern capability, test patterns are being transmitted on the ARINC 818 or DVI output.
- **Fault**—An input error has been detected.

For Fiber-to-DVI versions of the HS SAM, the **Link Status** indicators are interpreted as follows:

- **Sync loss** — After the link is established, green indicates a synchronous link to the ARINC 818 source. Red indicates that the unit can't establish synchronization with an ARINC 818 input. This may be due to the fiber being unplugged or the ARINC 818 source being of the wrong link rate (e.g., 1.0625 Gbps vs. 3.1875 Gbps).
- **SOFi Detect** — Green indicates that valid start-of-packet indicators have been detected in the ARINC 818 input. Red indicates valid start-of-frame indicators have been lost for several frames in a row. Return to green requires 250 milliseconds of persistence.
- **Idle OS Detect** — Green indicates valid Idle OS indicators have been detected in the ARINC 818 input. Red indicates Idle OS indicators have been lost during packet and frame. Return to green requires 250 milliseconds of persistence.

3.3 ARINC 818 Transmission

3.3.1 Transmit radio button controls

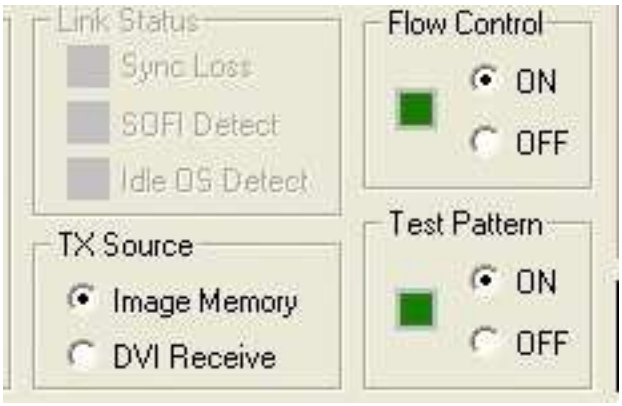

Figure 3.3.1. TX Source choices.

The **TX Source** radio buttons allow users to transmit static images loaded into the HS SAM internal memory or to transmit video from an external live video source (e.g., DVI-to-fiber or Fiber-to-DVI).

The flow control radio buttons allow users to turn of the transmitter. In the case of DVI-to-fiber units, this will cause the unit to transmit Idle OS on the ARINC 818, and in the case of Fiber-to-DVI units to transmit a blue screen on DVI.

3.3.2 Transmit test patterns

Most firmware versions of the HS SAM have built-in test patterns that can be turned on from the HS SAMView2 software radio buttons or from the rocker switch on the HS SAM unit.

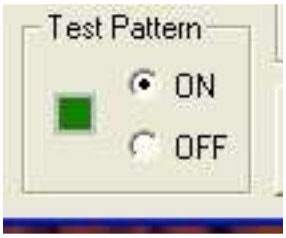

Figure 3.3.2a. Test Pattern radio button.

The typical test pattern is gray scale with scrolling lines as shown below.

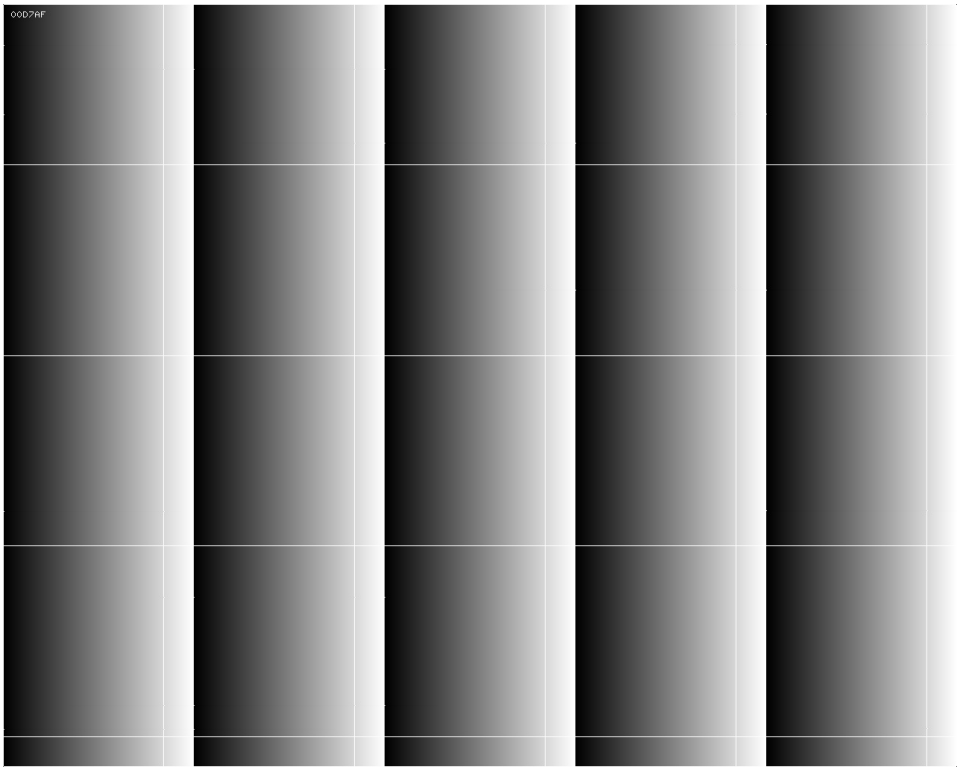

Figure 3.3.2b. Gray scale test pattern.

3.3.3 Loading custom images into the HS SAM

The **Load Image** button can be used to load any bitmap image into the internal memory of the HS SAM. This bitmap image will be automatically resized for the resolution of the ARINC 818 interface. Once loaded, the image can be transmitted on ARINC 818.

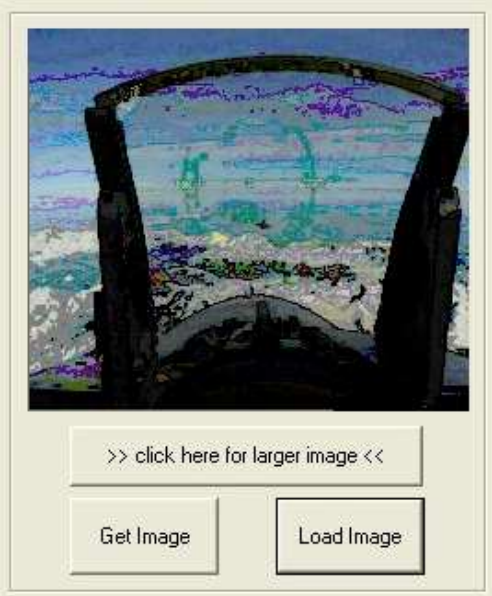

Figure 3.3.3. Load Image button.

A thumbnail of the loaded image can be viewed in the HS SAMView2 GUI and enlarged to full size in a separate pop-up window.

3.3.4 Loading Object 0 data into the HS SAM

Figure 3.3.4a. Header Management button.

The header management button on the main GUI will produce a pop-up window that can be used for loading and retrieving Object 0 frame data.

For Fiber-to-DVI versions of the HS SAM, the pop-up will appear as follows:

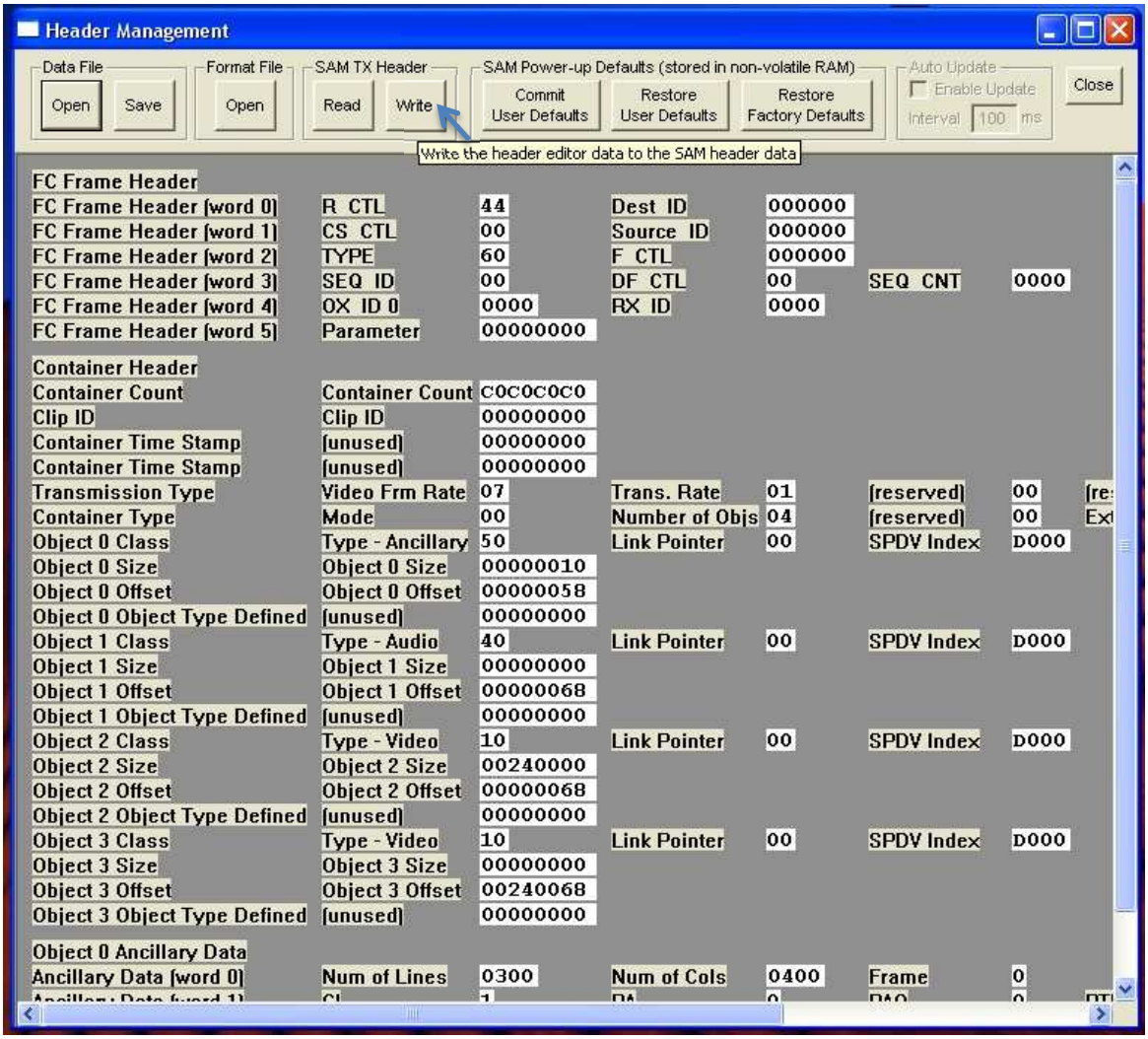
Header Management
Data File
Open
Save
Format File
Open
SAM TX Header
Read
Write
SAM Power-up Defaults (stored in non-volatile RAM)
Commit User Defaults
Restore User Defaults
Restore Factory Defaults
Auto Update
Enable Update
Interval 100 ms
Close
Write the header editor data to the SAM header data
FC Frame Header
FC Frame Header (word 0) R_CTL 44 Dest_ID 000000
FC Frame Header (word 1) CS_CTL 00 Source_ID 000000
FC Frame Header (word 2) TYPE 60 F_CTL 000000
FC Frame Header (word 3) SEQ_ID 00 DF_CTL 00 SEQ_CNT 0000
FC Frame Header (word 4) OX_ID 0 0000 RX_ID 0000
FC Frame Header (word 5) Parameter 00000000
Container Header
Container Count Container Count C0C0C0C0
Clip ID Clip ID 00000000
Container Time Stamp (unused) 00000000
Container Time Stamp (unused) 00000000
Transmission Type Video Frm Rate 07 Trans. Rate 01 (reserved) 00
Container Type Mode 00 Number of Objs 04 (reserved) 00
Object 0 Class Type - Ancillary 50 Link Pointer 00 SPDV Index D000
Object 0 Size Object 0 Size 00000010
Object 0 Offset Object 0 Offset 00000058
Object 0 Object Type Defined (unused) 00000000
Object 1 Class Type - Audio 40 Link Pointer 00 SPDV Index D000
Object 1 Size Object 1 Size 00000000
Object 1 Offset Object 1 Offset 00000068
Object 1 Object Type Defined (unused) 00000000
Object 2 Class Type - Video 10 Link Pointer 00 SPDV Index D000
Object 2 Size Object 2 Size 00240000
Object 2 Offset Object 2 Offset 00000068
Object 2 Object Type Defined (unused) 00000000
Object 3 Class Type - Video 10 Link Pointer 00 SPDV Index D000
Object 3 Size Object 3 Size 00000000
Object 3 Offset Object 3 Offset 00240068
Object 3 Object Type Defined (unused) 00000000
Object 0 Ancillary Data
Ancillary Data (word 0) Num of Lines 0300 Num of Cols 0400 Frame 0

Figure 3.3.4b. Header Management data displayed.

Header data is contained in simple text data files accessible using the **Open** button. Once opened, the data will populate the form. The data can then be written into the HS SAM using the **Write** button. Once written to the HS SAM, the data will be transmitted on the outgoing ARINC 818 stream.

3.3.5 Setting the default Object 0 data for the HS SAM

Default Object 0 data is stored in non-volatile memory on the HS SAM. This data is loaded after each power-up and will be transmitted on the ARINC 818 until modified by USB. This default data can be changed and stored to reflect user A818 video specification requirements.

Figure 3.3.5. Power-up Defaults choices.

The **Commit User Defaults** will store the header data currently streaming the A818 output into the non-volatile RAM. This data will be used for the Object 0 data frame after each subsequent power-up.

The contents of non-volatile RAM can also be restored using the HS SAMView2 software by clicking the **Restore User Defaults** button. In addition, factory default data can be restored using the **Restore Factory Defaults** button.

3.4 ARINC 818/DVI Receive

3.4.1 Retrieving captured images from the HS SAM

The **Get Image** button can be used to retrieve images captured from the ARINC 818 input. When using the **Get Image** feature, ARINC 818 flow is temporarily halted during the image transfer over USB. Therefore, the images represent snapshots of the ARINC 818 video.

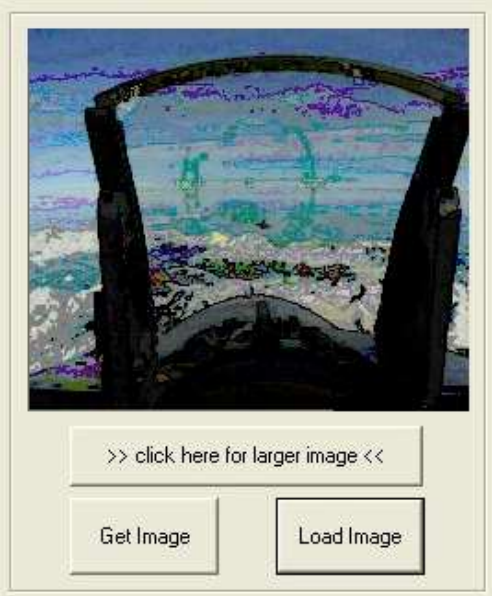

Figure 3.4.1. Get Image button.

A thumbnail of the loaded image can be viewed in the HS SAMView2 GUI and enlarged to full size in a separate pop-up window. Once the image is retrieved, it can be saved to a bitmap file.

Retrieving captured images from the HS SAM DVI Image Receive process follows exactly the same procedure.

3.4.2 Retrieving Object 0 data from the HS SAM

The header management button on the main GUI will produce a pop-up window that can be used for loading and retrieving Object 0 frame data.

Figure 3.4.2a. Header Management button.

For Fiber-to-DVI versions of the HS SAM, the pop-up will appear as follows:

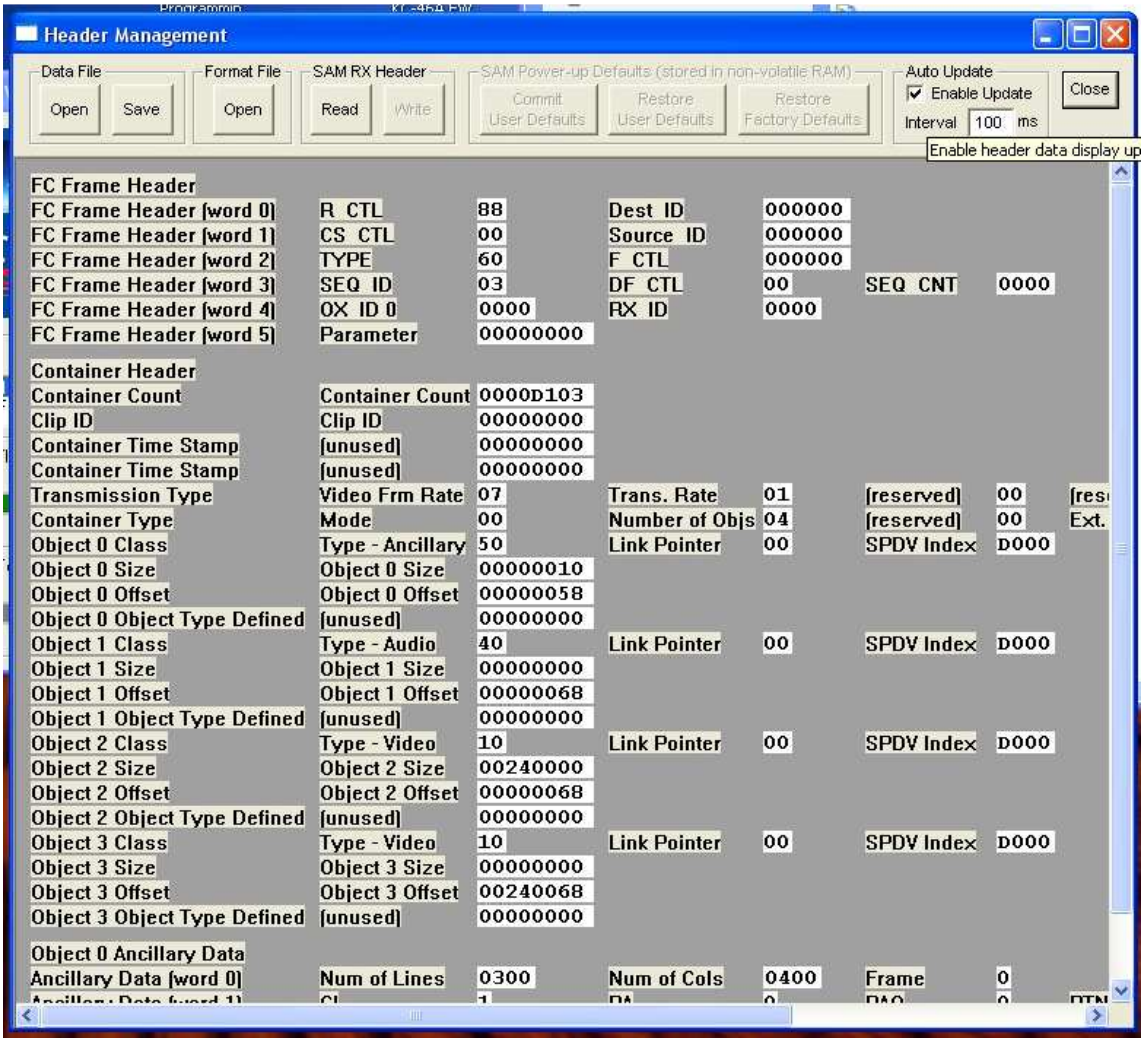
Header Management
Data File
Open
Save
Format File
Open
SAM RX Header
Read
Write
SAM Power-up Defaults (stored in non-volatile RAM)
Commit User Defaults
Restore User Defaults
Restore Factory Defaults
Auto Update
Enable Update
Interval 100 ms
Close
Enable header data display up
FC Frame Header
FC Frame Header [word 0] R_CTL 88 Dest_ID 000000
FC Frame Header [word 1] CS_CTL 00 Source_ID 000000
FC Frame Header [word 2] TYPE 60 F_CTL 000000
FC Frame Header [word 3] SEQ_ID 03 DF_CTL 00 SEQ_CNT 0000
FC Frame Header [word 4] OX_ID 0 0000 RX_ID 0000
FC Frame Header [word 5] Parameter 00000000
Container Header
Container Count Container Count 0000D103
Clip ID Clip ID 00000000
Container Time Stamp [unused] 00000000
Container Time Stamp [unused] 00000000
Transmission Type Video Frm Rate 07 Trans. Rate 01 [reserved] 00
Container Type Mode 00 Number of Objs 04 [reserved] 00 Ext.
Object 0 Class Type - Ancillary 50 Link Pointer 00 SPDV Index D000
Object 0 Size Object 0 Size 00000010
Object 0 Offset Object 0 Offset 00000058
Object 0 Object Type Defined [unused] 00000000
Object 1 Class Type - Audio 40 Link Pointer 00 SPDV Index D000
Object 1 Size Object 1 Size 00000000
Object 1 Offset Object 1 Offset 00000068
Object 1 Object Type Defined [unused] 00000000
Object 2 Class Type - Video 10 Link Pointer 00 SPDV Index D000
Object 2 Size Object 2 Size 00240000
Object 2 Offset Object 2 Offset 00000068
Object 2 Object Type Defined [unused] 00000000
Object 3 Class Type - Video 10 Link Pointer 00 SPDV Index D000
Object 3 Size Object 3 Size 00000000
Object 3 Offset Object 3 Offset 00240068
Object 3 Object Type Defined [unused] 00000000
Object 0 Ancillary Data
Ancillary Data [word 0] Num of Lines 0300 Num of Cols 0400 Frame 0

Figure 3.4.2b. Recovered header data.

Header data recovered from the incoming ARINC 818 stream can be read from the HS SAM using the **Read** button. The retrieved data will populate the form as shown above.

This data can then be saved in a simple text data file using the **Save** button.

3.5 Multiple HS SAMs connected to the same PC

When multiple HS SAMs are connected to a single PC, the HS SAMView2 software will list each of them in the **Configuration** box.

User can click on one of the units listed to connect to that HS SAM.

HS SAM Configuration
Click to select:
1280x1024 1.0625Gb/s 108.00MHz MONO F2DVI V3669
1280x1024 1.0625Gb/s 108.00MHz MONO DVI2F V3669

Figure 3.5. Multiple SAMs listed in the HS SAM Configuration box.

All status indicators, radio button controls, image and data transfers will target the particular unit that is selected in this window.

3.6 Changing the Object 0 data view format

The HS SAMView2 software provides a way to customize the view of the Object 0 frame data so that data can be more easily interpreted. This is accomplished using *.hfd files. The HS SAMView2 will automatically use the default.hfd file to define the fields and labels for the header form. The typical default.hfd view appears as follows:

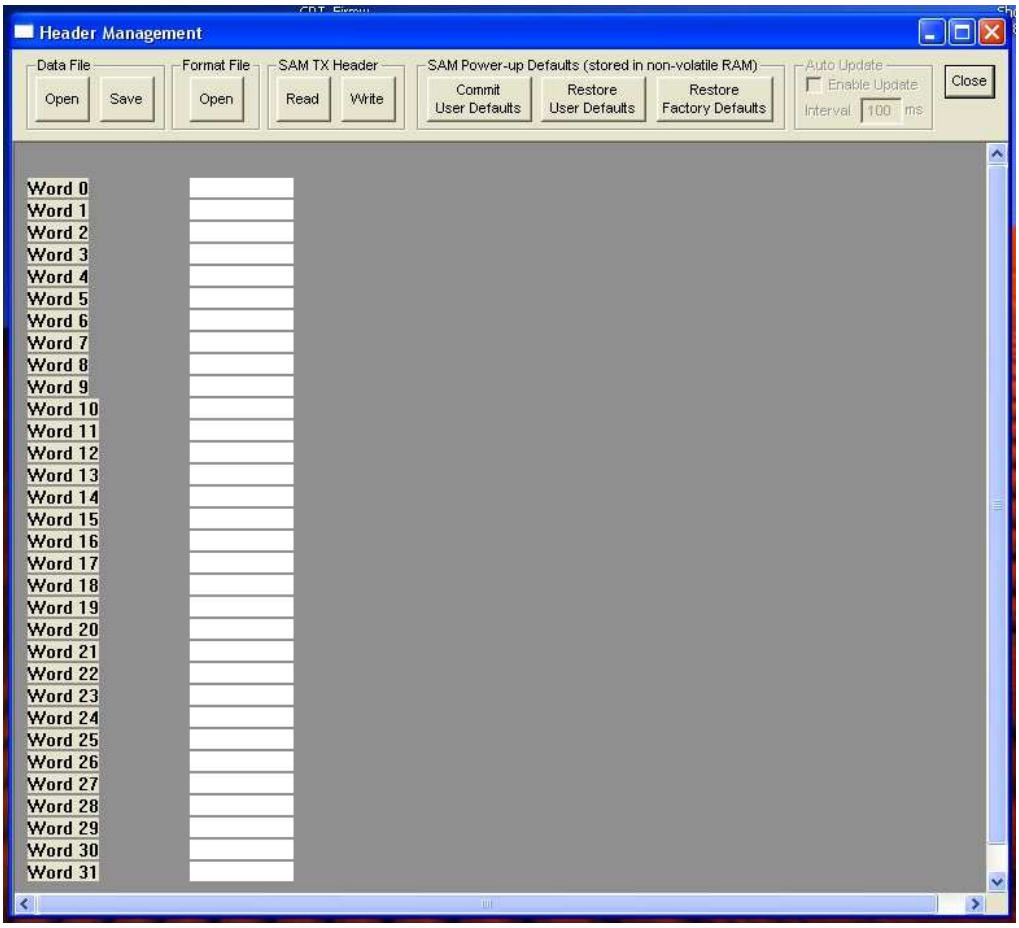

Figure 3.6a. Typical default.hfd view

Under Format File, the **Open** button will allow you to choose a new format file for the data (*.hfd)

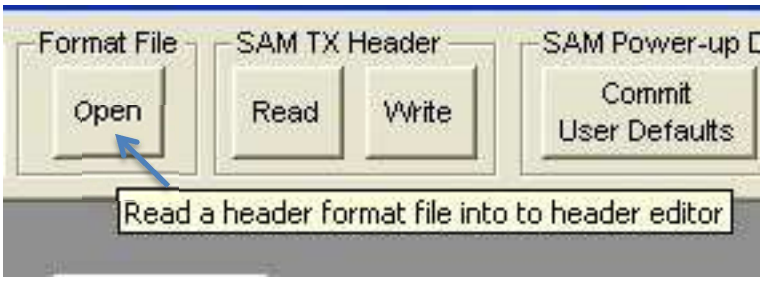

Figure 3.6b. The Open button under File Format.

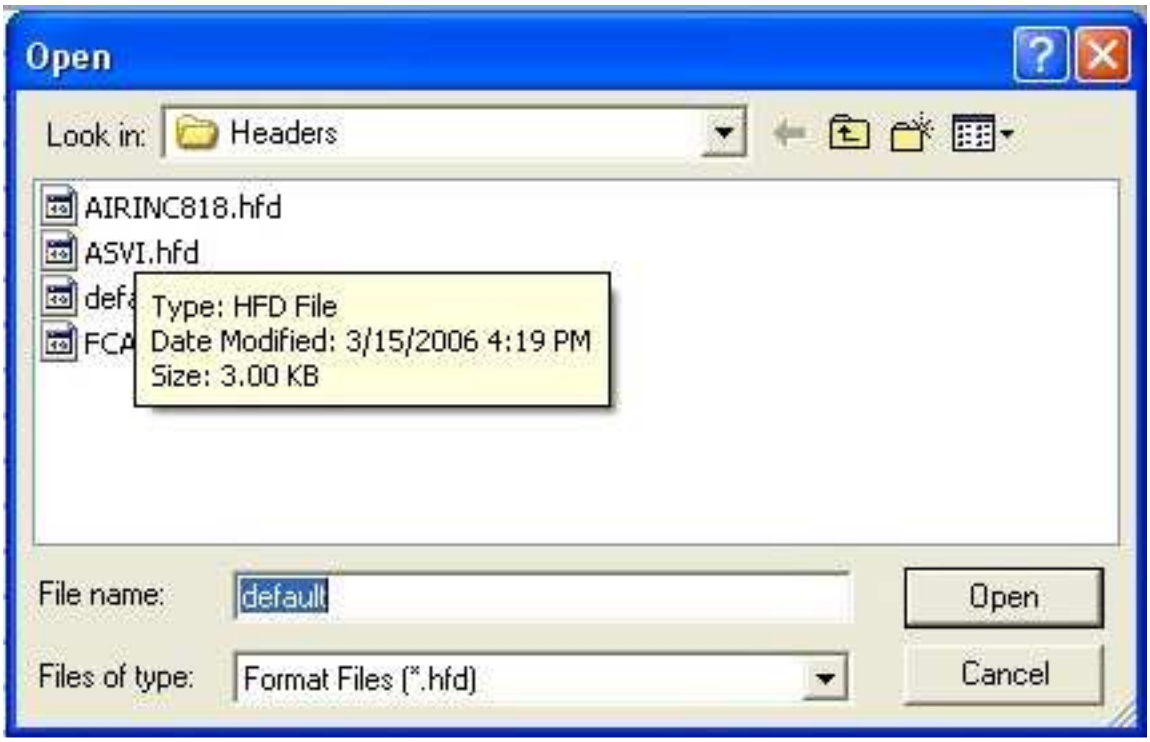

Figure 3.6c. Creating a default format.

Any number of format files can be created and used with HS SAMView2. To make one of these format files the default file for the HS SAM View software, simply change the name of the desired file to default.hfd

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